



SHORT REPORT

Should health care workers in the tropics be immunized against varicella?

V. S. Richard*, T. J. John*, J. Kenneth*, P. Ramaprabha†, P. J. Kuruvilla† and G. M. Chandy*

*Hospital Infection Control Committee, †Staff & Students Health Centre, Christian Medical College and Hospital, Vellore, India

Summary: In tropical regions, chickenpox affects both adults and children. Therefore, healthcare workers in the tropics are vulnerable to hospital-acquired varicella infection and they may transmit infection to susceptible hospitalized individuals. Although the varicella vaccine is safe and effective, its cost is a deterrent to its use in routine immunization programmes. In order to assess whether vaccination of susceptible healthcare workers to prevent hospital-acquired transmission may be justified, we have documented the frequency of varicella among healthcare workers in our hospital. There were 96 admissions for varicella during the 1993–1997 period; staff and student nurses accounted for 76%. The peak season of admission was from February to April. The attack rate in staff and student nurses was 0.78 and 1.54 per 100 person-years, respectively. While community outbreaks of varicella occur in this region once in 4–5 years, hospital outbreaks of varicella occurred every year. This poses the risk of transmission to hospitalized patients, with serious consequences among immunocompromized individuals. Therefore, we recommend systematic selective vaccination of susceptible healthcare workers to break this cycle of annual varicella outbreaks among hospital personnel.

© 2001 The Hospital Infection Society

Keywords: Chickenpox; epidemiology; occupational diseases; epidemiology; personnel; hospital Healthcare workers; varicella.

Introduction

In temperate regions chickenpox (varicella) is almost exclusively a childhood disease and over 90% of adults are immune.^{1–3} This is not the case in the tropics and subtropics, where it is almost equally distributed between children and adults.^{4–7} Consequently, staff and students of healthcare professions may be vulnerable to develop hospital-acquired varicella and also act as a source of infection to hospitalized, susceptible children and

adults.^{8–10} This phenomenon applies even to hospitals in temperate regions where healthcare personnel from the tropics may be employed, as they would possess or pose exactly the same risks.^{11,12} In hospital wards where immunosuppressed patients are admitted, varicella can pose a very serious problem. Our clinical colleagues have faced this problem several times.

The varicella vaccine is effective and safe, but relatively expensive.¹³ The major constraint to its widespread use in children or adults in tropical countries is its high cost.⁶ The policy not to promote its routine use is justified since varicella is not usually associated with serious complications or fatality. On the other hand, varicella vaccination of susceptible healthcare workers may be cost-effective, as it will prevent spread within hospitals and

Received 31 May 2000; revised manuscript accepted 13 September 2000.

Author for correspondence: Dr George M. Chandy, Medical Superintendent, Christian Medical College and Hospital, Vellore 632 004, Tamilnadu, India.

Fax: 0091-416-232035; E-mail: rich@cmcvellore.ac.in

reduce absence from work. However, the incidence/prevalence of hospital-acquired varicella has to be documented and found high in order to justify the proposed recommendation of routine vaccination of entrants to healthcare professions. Our purpose in this paper is to report the frequency of varicella in students and staff of our tertiary care hospital in tropical south India.

Material and methods

We reviewed and analysed the number of staff and students who were admitted into the isolation ward on account of varicella, during 1993–1997. The diagnosis was made clinically.

Results

There were outbreaks of varicella among staff/students each year, as shown in Fig. 1. There were 96 admissions for varicella in five years (range 11–31 year, mean 19/year). The subjects were 44 staff

nurses, 29 student nurses, seven medical students, nine physicians, five paramedical staff and two housekeeping staff. The seasonal distribution is also shown in Fig. 1. February to April was the high prevalence season. There was a second minor peak in September. There was no case in December, and only once there was a case in June.

Staff and student nurses accounted for 76% of admissions for varicella. There were 5615 person-years of staff nurses on the hospital rolls over these five years, with 44 varicella admissions. The attack rate was 0.78 per 100 person-years. There were 1875 person-years of nursing students, with 29 episodes of varicella; attack rate of 1.54 per 100 person-years. We have not attempted to estimate the attack rates in other categories for reasons given later.

Discussion

The medical, nursing and paramedical schools attached to our hospital are strictly residential. The

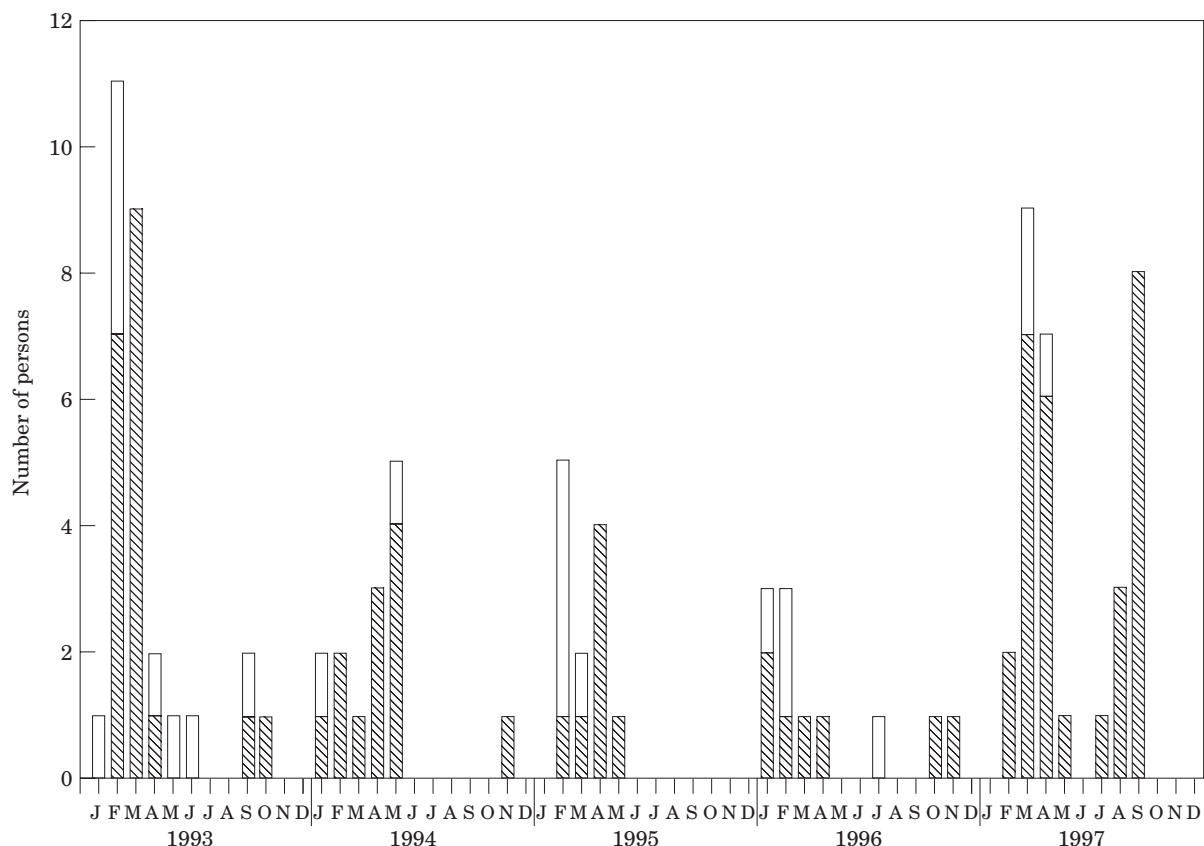


Figure 1 Monthly distribution of varicella. Student and staff nurses (▨); other healthcare workers (□).

staff hostel on campus accommodates 60% of all staff nurses. When medical or paramedical students develop varicella, they tend to travel immediately to their homes and return only after recovery. Most of them are from out of town. We have no record of the numbers of such episodes. On the other hand, all student nurses live in the hostel and are admitted to the isolation ward when diagnosed as infected with varicella. This accounts for the large proportion of student nurses in the study population. Staff nurses in the hostel are mostly single women who prefer to remain in the hospital when varicella is diagnosed. The close contact of nurses (both staff and student) with inpatients, may be another reason for the relatively higher prevalence of varicella amongst them.

Community outbreaks of varicella occur in this region only once every 4–5 years.⁶ However, the virus must survive and continue to spread, albeit infrequently, particularly in urban high-density communities. Outbreaks are consequent to the accumulation of susceptible individuals and the spread of virus among them. We surmise that 1993 and 1997 were outbreak years, but in the absence of disease surveillance, records are unable to verify this. The presence of varicella during the interim years confirms the persistence of the virus in the community. We have seen these annual hospital outbreaks of varicella, without a break, every year since 1977.^{8,10}

The only way to break this cycle is to immunize all students and staff without a previous history of varicella. If those without a clinical history of varicella are screened for IgG antibodies to the varicella zoster virus by an enzyme immunoassay, those with past subclinical varicella could be identified and the numbers to be vaccinated could be reduced. The cost-effectiveness of this methodology needs to be assessed. We strongly recommend selective varicella immunization of all healthcare workers and new entrants into health professions, who have not had

clinical varicella previously (or are sero-negative). This is an ethical necessity, since varicella is now a known occupational health hazard and hospital clients are at increased risk of hospital acquired varicella because of this.

Reference

1. Preblud SR, D'Angelo LJ. Chicken pox in the United States, 1972–77. *J Infect Dis* 1979; **140**: 257–260.
2. Joseph CA, Noah ND. Epidemiology of chicken pox in England and Wales, 1967–85. *Br Med J (Clin Res Ed)* 1988; **196**: 673–676.
3. Muench R, Nassim C, Niku S, Sullivan-Bolyai JZ. Seroepidemiology of varicella. *J Infect Dis* 1986; **153**: 153–155.
4. Maretic Z, Cooray MPM. Comparison between chicken pox in tropical and a European country. *J Trop Med Hyg* 1963; **66**: 311–315.
5. Venkitaraman AR, Seigneurin JM, Lenoir GM, John TJ. Infections due to the human herpes viruses in southern India: a seroepidemiological survey. *Int J Epidemiol* 1986; **15**: 561–566.
6. Balraj V, John TJ. An epidemic of varicella in rural southern India. *J Trop Med Hyg* 1994; **97**: 113–116.
7. Ooi PL, Goh KT, Doraisingham S, Ling AE. Prevalence of varicella-zoster virus infection in Singapore. *Southeast Asian J Trop Med Public Health* 1992; **23**: 22–25.
8. Venkitaraman AR, John TJ. Chickenpox outbreak in staff and students of a hospital in the tropics. *Lancet* 1982; **2**: 165.
9. Nassar NT, Touma HC. Susceptibility of Filipino nurses to the varicella-zoster virus. *Infect Control* 1986; **7**: 71–72.
10. Venkitaraman AR, John TJ. The epidemiology of varicella in staff and students of a hospital in the tropics. *Int J Epidemiol* 1984; **13**: 502–505.
11. Hastie IR. Varicella-zoster virus affecting immigrant nurses. *Lancet* 1980; **2**: 154–155.
12. Kjersem H, Jepsen S. Varicella among immigrants from the tropics, a health problem. *Scand J Soc Med* 1990; **18**: 171–174.
13. Sparks L, Russell C. The new varicella vaccine: efficacy, safety and administration. *J Pediatr Nurs* 1998; **13**: 85–94.